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PROGRESS REPORT

Period of 6/15/61 to 7/15/61

Contract No. AF33(600)40280

General

Major activity for the monthly reporting period was in the drafting, laboratory breadboard and fabrication stages of various units and sub-assemblies.

Approximately 66% of the fabrication drawings have been released to the Model Shop and indications are that this should exceed 90% for the next period.

The chart on page 2 shows in graphical form the status of the overall program.

Page 3 shows a graph of drawing releases to the Model Shop.

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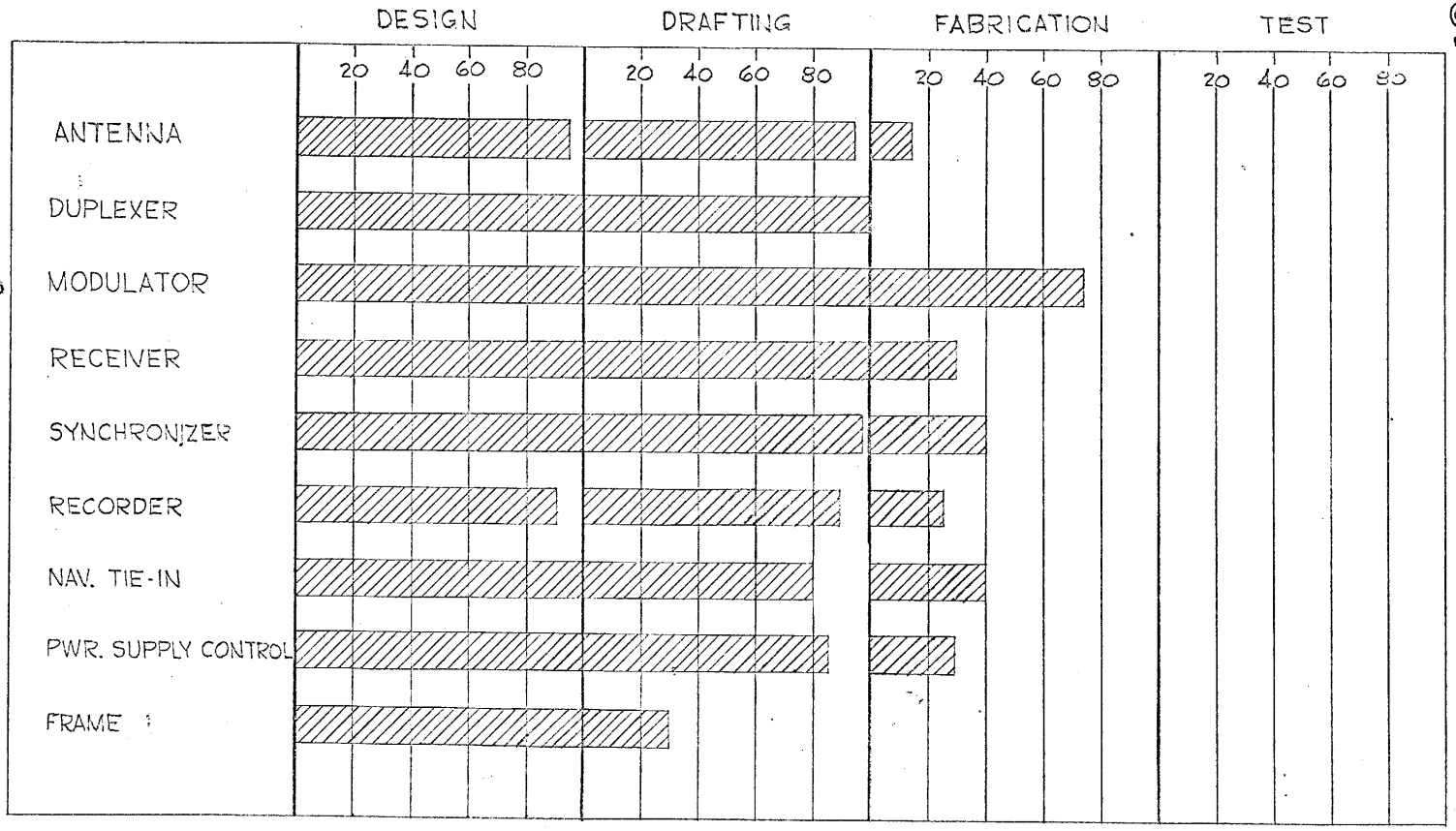
PROJECT STATUS

% COMPLETION OF 1ST RADAR FOR PERIOD ENDING 15 JULY 1961



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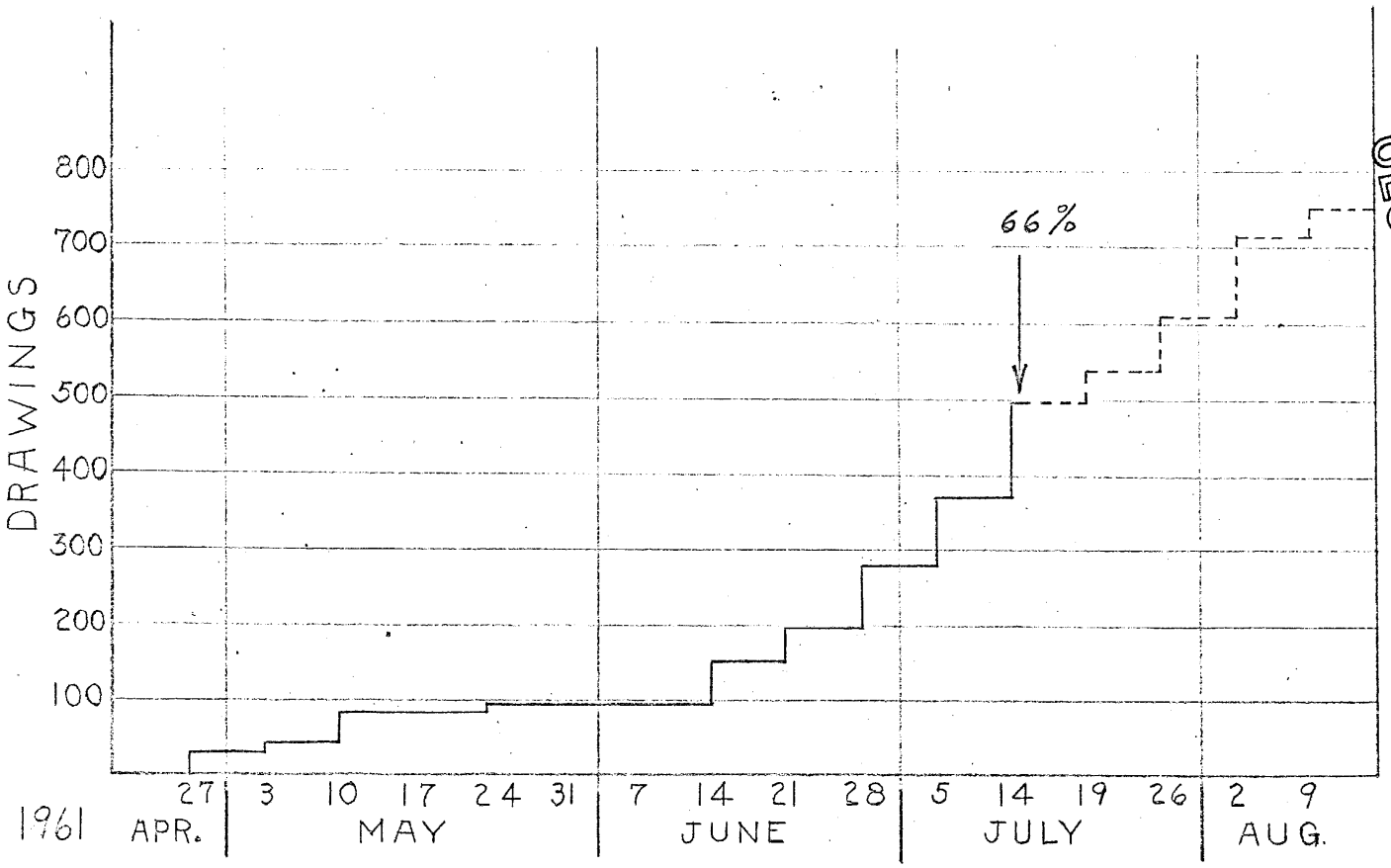

DRAWINGS RELEASED TO MODEL SHOP

Auxiliary Data Recorder

We are awaiting response to a proposal submitted which covered the addition of an auxiliary data recorder to the system.

Flight Test

The proposal for installation of the system in an F-101-B is being revised to consider two alternate methods of deriving navigation information; from an inertial navigation system and from a doppler navigation system.

Antenna

Structure

25X1 [redacted] is building the three honeycomb panels, due date is 1 August 1961. A yaw adjustable mount has been designed and will be added to the antenna assembly.

Manifold

25X1 [redacted] is electroforming the manifolds. Tooling is complete. Parts are being formed and the first manifolds are due 15 August 1961.

Array Stick

The hold on the array sticks has been released. The assembly procedure is being scheduled in detail to assure compliance with the system schedule.

Radome Design

The sealing radome remains the chief area of work and concern. The laminate which had given the best promise of meeting the mechanical requirements, was eliminated because of the resultant pattern deterioration.

A recanvas of the various suppliers yielded two possible laminates -- DuPont ML and MK fabrics. Both were tested and found acceptable by the MF section. Bonding, temperature and pressure tests are being conducted. So far, the MK fabric has been eliminated due to the thermoplastic qualities of its varnish. The ML fabric is sealing air after an exposure of over 140 hours at 550°F. Various bonding techniques are being utilized in order to find a reliable method of bonding. A A quote for the ML fabric has been requested and a purchase order will be issued upon receipt of the quote.

Metal "C" rings coated with silicon rubber are being tested concurrently with the laminate tests. Additional tests of metal "C" rings plated with silver or copper will be conducted. Also, tests will be run with a plastic compound "X" ring which has recently been made available by Allegheny Plastics, Inc.

Load Design

All of the loads received to date have failed to pass electrical tests. As a result of a joint meeting between the supplier and Westinghouse, a drawing change has been initiated to remove non-critical mechanical dimensions from the drawing in order to provide more design flexibility to the supplier.

Drafting

All drawings have been released to the Model Shop with the exception of the Yaw adjustable mount which is being drawn as of this date.

Fabrication

Fabrication of all antenna hardware items is complete.

Duplexer

25X1 [redacted] and [redacted] will witness final tests on 25X1

25X1 [redacted] square cross section, OHFC copper resonant ring during the week of 17 July or 24 July 1961. [redacted] has placed the order for invar-silver laminate waveguide for use in the three units to be ordered by 25X1 Westinghouse. Delivery of the guide to [redacted] to be 45 days and ~~delivery to Westinghouse of the guide to Airtron to be 45 days and~~ 25X1 delivery to [redacted] of the first ring is to be 45 days thereafter.

Ordering of the final three units will be initiated through 25X1 25X1 [redacted] channels during the week of 17 August 1961. [redacted] has approved the preliminary drawings and Westinghouse expects to finalize 25X1 the design and obtain [redacted] approval during the above tests.

Lay-out of the Resonant Ring and associated components has been started. All purchase part drawings are complete.

Lab tests on (Tank) filter resonator have indicated a problem in using a folded "T" to split power at switch. The "T" breaks down before the switches at high power.

Switch Driver

All duplexer driver drawings have been signed off by Engineering and are scheduled for release during the week of 17 August, 1961.

Switch Tubes

Tests on the first tube of present design were conducted using a magnetron modulator to pulse the tube. While using this modulator for pulsing, it was discovered that the charging cycle caused a sweeping action in the tube which could extinguish marginal RF firing of the tube. With the application of the trigger pulse to the

Switch Tubes (continued)

TR tube, the TR tube could be triggered with control over 60% of the RF pulse width being established. The ring power for these tests was approximately 40 K.W. The tube was tested at this low power because the initial tube design could not be fabricated. Since then a new fabrication technique has been followed and one tube is presently being prepared for testing. It is hoped that the new design, which has the dimensions used in the theoretical analysis, will work at or close to the full system power.

Sumultaneously with the high power tests, low level measurements are being made on a sample tube to determine what level of insertion loss can be achieved.

Power Monitor

All drawings are complete and have been released to the Model Shop.

25X1

Modulator

The first klystron power amplifier was received from [redacted] on 14 July, 1961, data received with it indicates that 72 K.W. output can be achieved at a current below the maximum rating.

The first draft of the modulator and KPA test specification has been completed.

Design of a test unit has been completed and parts ordered. This unit is required to perform the control and monitor functions normally performed by the radar control panel as well as enabling unit tests to be made.

A fixture to support the modulator and prevent it resting on the klystron and also furnish air to cool the klystron collector and body has been designed and built.

Except for 2 missing parts, the trigger generator has been completed.

The modulator chassis is now being wired.

Receiver

Travelling Wave Tube

A revised PDS along with the purchase parts drawing have been sent to the manufacturer for approval.

I.F. Amplifier

The chassis for three units have been assembled, plated and marked. Drawings for all fixed coils are complete and all but one released to the shop. Transformer forms and cases are built and winding drawings are near completion.

Video Amplifier

The chassis for three units have been assembled and are being plated. All drawings for the coils have been released to the shop.

Synchroniser

Frequency Generator (Variable Frequency Oscillator Section)

Relcoil unshielded inductors have been substituted for the original inductors without any apparent ill effects.

Frequency Generator (I.F. Section)

Relcoil inductors were substituted satisfactorily. A television type discriminator has also been reworked to exhibit crossover at 30 MC and installed in place of the Bulova discriminator to permit checking the approximate operation of the other chassis. No data available at this time.

Frequency Generator (Fixed Frequency Oscillator Section)

Relcoil inductors were substituted except for two stages which required values of inductance different from those on hand. Additional inductors for these stages have been ordered.

Frequency Generator (Oscillator-Discriminator)

This unit was sent back to [redacted] because of linearity and cross talk problems. Return of the corrected unit to Air Arm has been scheduled for 25 Aug. 1961. [redacted] has stated that 2 more units can be furnished in 2 weeks following Westinghouse testing and acceptance of the corrected unit. This schedule will allow about one week to check out the corrected unit with the system in order to meet the Model shop requirements of one unit by 15 Sept. 1961.

25X1

25X1

Microwave Oscillator

All drawings of the microwave oscillator have been released to the Model Shop. The MWO power supply has been modified and the Phase/Detector may be complete and ready for test by 1 Aug. 1961.

Recorder

It is estimated that approximately 90% of the total design work has been completed.

During the month of June the trace viewing assembly and the Supporting Frame Assembly were released for fabrication.

Design of the Recorder Covers has been completed and release for fabrication will be early in the next month.

Recorder (continued)

During the first assembly stages it became evident that great difficulty will be encountered in assuring true concentricity of the capstan and the film driven viscous drag roller. Methods of improving the tolerances on these components is now being investigated.

CRT-Optics

Because of delays in the CRT development program, three tubes with 1.0 mil Spot size and fibre optic face plates have been ordered and delivery is scheduled for 60 to 90 days. These tubes will allow complete testing of the recorder except for ultimate resolution which will be made when the 0.5 Mil tubes become available.

Test Set

A technical report covering description and operation of the test panel and also a schematic & wiring diagram have been completed.

Centering Coils

A packaging difficulty has been resolved by sending to Delco an outline drawing showing the tube and tube shield. The centering coil and yoke will now be fabricated as one assembly.

Connector

A new Bendix Pygmy connector was selected consisting of a size twenty shell and a 39 pin insert. This will provide the two pins for #16 wire which are necessary for the high current requirement of the 28 volt lines.

Inverter

25X1

The inverter from [redacted] has been received and checked. With nominal + 28 Volt input and actual synchronous motor load, the frequency stability was found to be well within ± 0.005% after a 15 minute warm-up.

CRT Protection

The scan detector relay contacts have been re-wired to shunt the 500 volt power supply output to ground in the event of a scan loss.

Pulse Inputs

Pulse input simulation has been achieved using a Rutherford 37 and DH130 although the Rutherford 37 has a great deal of jitter for this application.

Parts Lists, Schematic, Wiring and Cabling

The parts list is being updated, completed and checked. The Schematic is being updated, completed and checked. Wiring and Cabling diagrams are being developed.

Navigation Tie-IN

From the geometry of the flying aircraft-ground configuration, it is evident that drift speed is a function of the pitch angle as well as the drift angle. It was determined that the pitch angle deviations during flight were significant in the drift speed calculation to be performed by the navigation tie-in.

Consequently, a pitch channel consisting of a servo repeater, i.e. a servo amplifier, motor-gearbox-variable resistor synchro control transformer combination has been added to satisfy this condition.

The servo amplifier has been designed, the gain-level adjustment board modified and both are now in drafting. All drawings including the modified top assembly are scheduled for completion by 24 July, 1961.

Power Supply-Control

The layout of the power supply has been completed and a partial release of drawings is scheduled for 17 July. Release of remaining drawings is expected on 21 July, 1961.

Frame Assembly

The scheduled release of engineering information to manufacturing has been revised from 17 July to 1 August, 1961. Design of the frame is complete and detaildrawings have been started.

Truss

Loyouts will start following final release of the frame.

Stress Analysis

The stress analysis is complete to the point where the frame attaches to the truss and has been suspended until the truss layouts are started.

Electrical

Engineering information in the form of a "D" Spec. has been submitted to drafting for the electrical portion of the frame. The electrical schematic is now in preliminary sketch form. New Purchase Part drawings are 90% complete and the FAM (Eng'r'g Authority to Manufacture) has been issued to order critical components. The above also applies to the unit test cables.

System Interconnection

The "D" Spec. has been submitted to drafting and work has started on the formal system interconnection drawing. The system power distribution schematic is now in preliminary sketch form.